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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,319	04/19/2004	Tetsuo Aoyama	060937-0186-US	1070
9629 7590 02/28/2007 MORGAN LEWIS & BOCKIUS LLP 1111 PENNSYLVANIA AVENUE NW WASHINGTON, DC 20004			EXAMINER CHAUDHRY, SAEED T	
			ART UNIT	PAPER NUMBER
			1746	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/28/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

**Application No.**

10/826,319

**Applicant(s)**

AOYAMA ET AL.

**Examiner**

Saeed T. Chaudhry

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 1-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/12/04</u> . | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION****Election/Restriction**

Applicant's election with traverse of Group II in Paper No. 11/20/2007 is acknowledged. The traversal is on the ground(s) that Group I and Group II claims are related as product and method of use. In fact, the method claims of Group II are method of using the product of Group I. The same purpose is called for in claim 1 of Group I and claim 26 of Group II. The product is described in the same way in claims 1 and 26. Hence the method of claims 26 cannot be practiced with a different material from the material of claim 1. This is not found persuasive because the product as claimed herein can be used for another process such as contacting the metal sulfide scale to dissolve scale in the solution or removing organic material from the surface of metal, which is not a semiconductor.

The requirement is still deemed proper and is therefore made FINAL.

The applicant is advised to include the claims 1 and 25 limitations in the process claims.

**Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (c) he has abandoned the invention.
- (d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months before the filing of the application in the United States.
- (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.
- (f) he did not himself invent the subject matter sought to be patented.

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(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

**Claims 32-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Gotoh et al.**

Gotoh et al (6,514,352) disclose a method for cleaning plasma ashed residue from the surface of semiconductors by contacting the semiconductor with oxidizing agent from 0.0001 to 60% by weight; an acid in the range of 0.01 to 10% such as diethylene triamine penta methylenephosphonic acid; ammonium fluoride from 0.001 to 20% by weight; organic solvent from 1 to 70% by weight such as N, N-dimethylacetamide and diethylene glycol monobutyl ether and balance water. After cleaning rinsing with ultrapure water and dried steps are performed. The cleaning solution pH shall not specifically be restricted and it is usually used in a range of pH 3 to pH 12. The cleaning solution temperature falls in the range of room temperature to 80 C (see col. 3, line 46 to col. 5, line 49 and claims).

The claimed process utilizes comprising language. Therefore, it does not restrict any other components and read on the Gotoh et al process of cleaning and removing the residue from the semiconductor surface. Gotoh et al disclose semiconductor having copper metal thereon. Therefore, semiconductor inherently have 0.002 dielectric constant.

**Claims 32-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Seijo et al.**

Seijo et al (6,773,873) disclose a method removing particles from a semiconductor substrate by forming a conductive line pattern from a metal material or a semiconducting material on a semiconductor substrate; forming an insulation film on the conductive line pattern, forming a via hole in the insulation film by dry etching, thereby producing particles

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comprising at least one resultant product from the insulation film or the metal material on the semiconductor substrate; and cleaning the resultant product with a semi-aqueous cleaning formulation. Wherein the cleaning composition comprising fluoride source and organic solvent such as ammonium fluoride, ammonium bifluoride in the range of 0 to 25%, amide or ether functional group in the range of 0 to 95% and balance water. The cleaning process is followed by deionized water rinse and dried (see claim 9, col. 4, line 20 to col. 5, line 45).

The claimed process utilizes comprising language. Therefore, it does not restrict any other components and read on the Seijo et al process of cleaning and removing the residue from the semiconductor surface. Seijo et al disclose semiconductor having copper metal thereon. Therefore, semiconductor inherently have 0.002 dielectric constant.

### **Claim Rejections - 35 USC § 103**

**The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:**

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**Claims 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gotoh et al in view of Park et al and Hada et al.**

Gotoh et al were discussed supra. However, the reference fails to disclose 0.2 to 5% by weight of an alkanolamine in the cleaning solution.

Gotoh et al disclose that the cleaning agent used in the present invention may be blended, if necessary, with additives which have so far been used for a resist peeling solution as long as the object of the present invention is not damaged (see col. 5, lines 29-32).

Park et al (6,508,887) discloses a method of removing resist residue by contacting with a solution of an alkoxy N-hydroxyalkyl alkanamide; alkanolamine and a fluoride based reducing agent.

Hada et al (5,911,836) disclose a method of producing a semiconductor device, which includes applying a conductive metal film on a semiconductor wafer, applying a photoresist on the conductive metal film, removing the photoresist with a removing agent containing a fluorine compound or at least one basic component selected from the group consisting of a quaternary ammonium hydroxide, an alkanolamine and a mixture of an alkanolamine and a reducing agent, and cleaning the resultant semiconductor device by rinsing with a rinse comprising water and at least one peroxide compound (see abstract).

It would have been obvious at the time applicant invented the claimed process to incorporate the cited alkanolamine as disclosed by Park et al and Hada et al into the process of Gotoh et al for purpose of removing and cleaning resist residue from the surface of the substrate because all the references are removing resist residue. It is well known in the art to combine the composition which are known for the same purpose to increase the efficiency. It would have been obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose in order to form a third composition which is to be used for the very same

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purpose (see *In re Kerkhoven* 205 USPQ 1069 or *In re Crockett* 126 USPQ 186, 188 (1960) or *In re Lindner* 173 USPQ 356, 357).

Further, Alkanolamine is well known in the art for removing resist residue but increase the corrosion effect on the metal surface. Gotoh et al disclose that the cleaning agent used in the present invention may be blended, if necessary with additives which have so far been used for a resist peeling solution as long as the object of the present invention is not damaged. Therefore, one of ordinary skill in the art would expect that very low percentage such as 0.2 to 5% would not effect corrosion on the metal surface and with routine experimentation would find the best percentage in the composition. Further, it is well known in the art to manipulate the percentage of the composition for better and efficient results. It has been held obvious that if any minor optimization are necessary to meet the instant claim limitations, optimization of relative proportions and operating conditions are within the discretion of the skilled artisan (see *In Aller et al.* 105 USPQ 233, 42 CCPA 824). The references does not specifically teach the particular ranges presently claimed, although overlapping values are taught in the section cited above. However, no criticality has been shown for the presently claimed ranges over the closest prior art, and optimization of results would have been obvious to one skilled in the art. See *In re Budd*, 138 USPQ 71, 73, 73 (CCPA 1963). Overlapping ranges may establish prima facie obviousness. See *in re Malagari*, 182 USPQ 549, 553 (CCPA 1974) (J. Rich). Gotoh et al disclose semiconductor having copper metal thereon. Therefore, semiconductor inherently have 0.002 dielectric constant.

***Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saeed T. Chaudhry whose telephone number is (571) 272-1298. The examiner can normally be reached on Monday-Friday from 9:30 A.M. to 4:00 P.M.***

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*If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Michael Barr, can be reached on (571)-272-1414. The fax phone number for non-final is (703)-872-9306.*

*When filing a FAX in Gp 1700, please indicate in the Header (upper right) "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communication with the PTO that are for entry into the file of the application. This will expedite processing of your papers.*

*Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (571) 272-1700.*

*Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).*

**Saeed T. Chaudhry**  
Patent Examiner



**MICHAEL BARR**  
SUPERVISORY PATENT EXAMINER